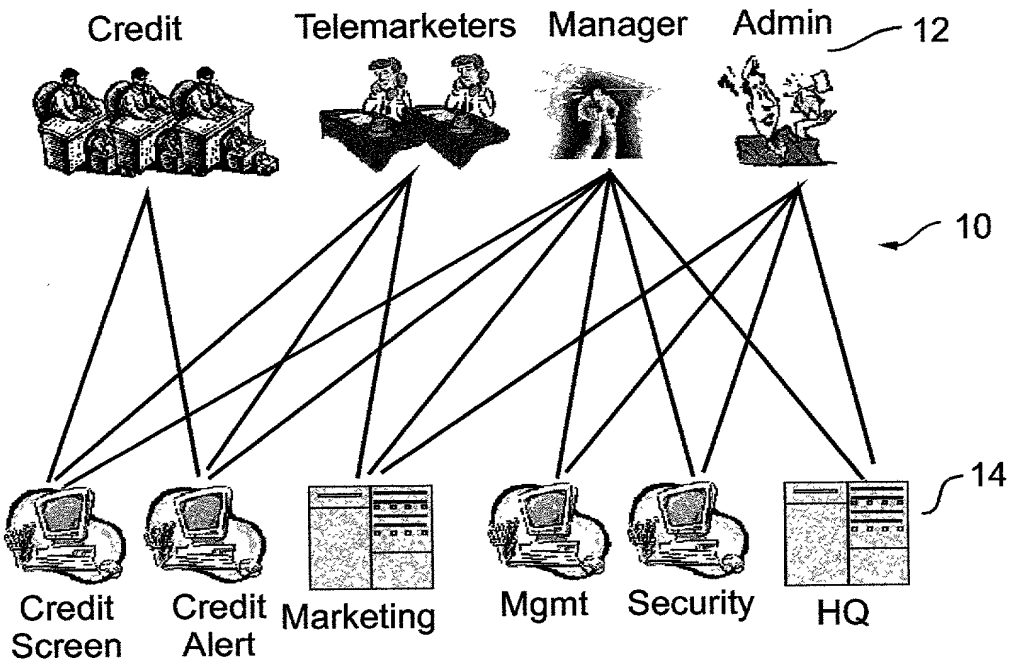
Credit
Telemarketers
Manager
Admin
12
10
14
Credit Screen
Credit Alert
Marketing
Mgmt
Security
HQ

Fig. 1

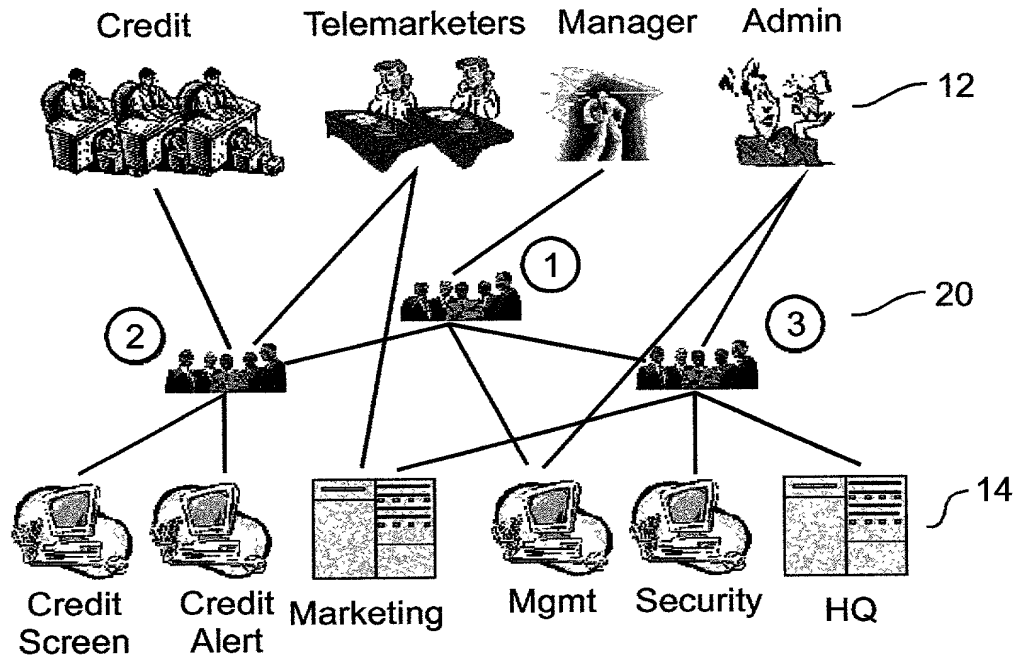
Credit
Telemarketers
Manager
Admin
12
1
2
3
20
14
Credit Screen
Credit Alert
Marketing
Mgmt
Security
HQ

Fig. 2

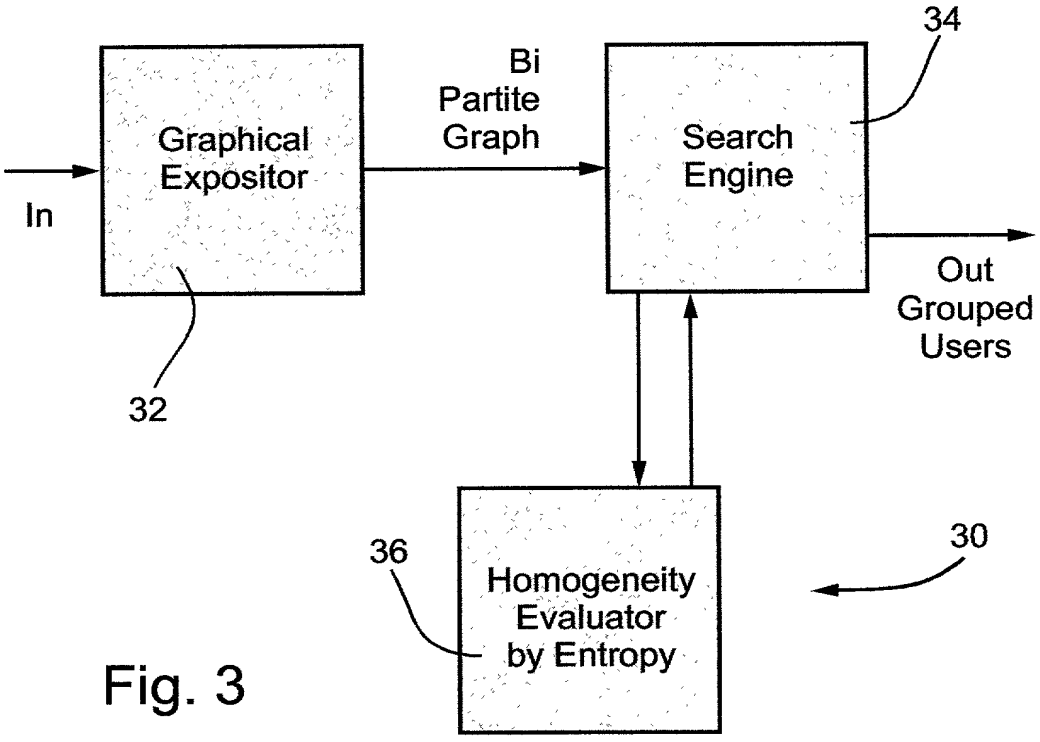
Graphical
Expositor
In
Bi
Partite
Graph
Search
Engine
34
Out
Grouped
Users
32
36
Homogeneity
Evaluator
by Entropy
30

Fig. 3

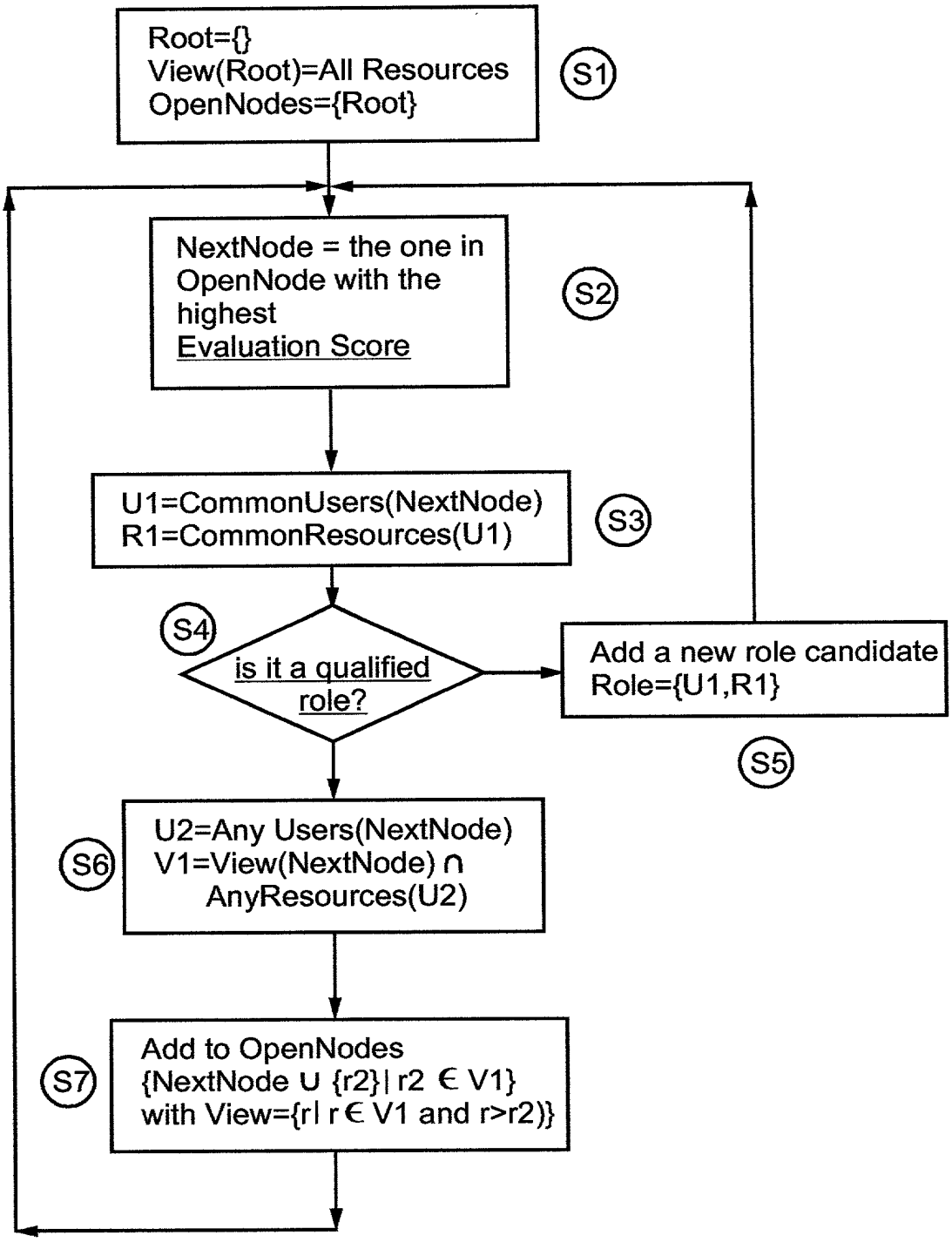
Root={}
View(Root)=All Resources
OpenNodes={Root}
S1
NextNode = the one in OpenNode with the highest Evaluation Score
S2
U1=CommonUsers(NextNode)
R1=CommonResources(U1)
S3
S4
is it a qualified role?
Add a new role candidate
Role={U1,R1}
S5
U2=Any Users(NextNode)
V1=View(NextNode) ∩ AnyResources(U2)
S6
Add to OpenNodes
{NextNode ∪ {r2}| r2 ∈ V1}
with View={r| r ∈ V1 and r>r2)}
S7

Fig. 4

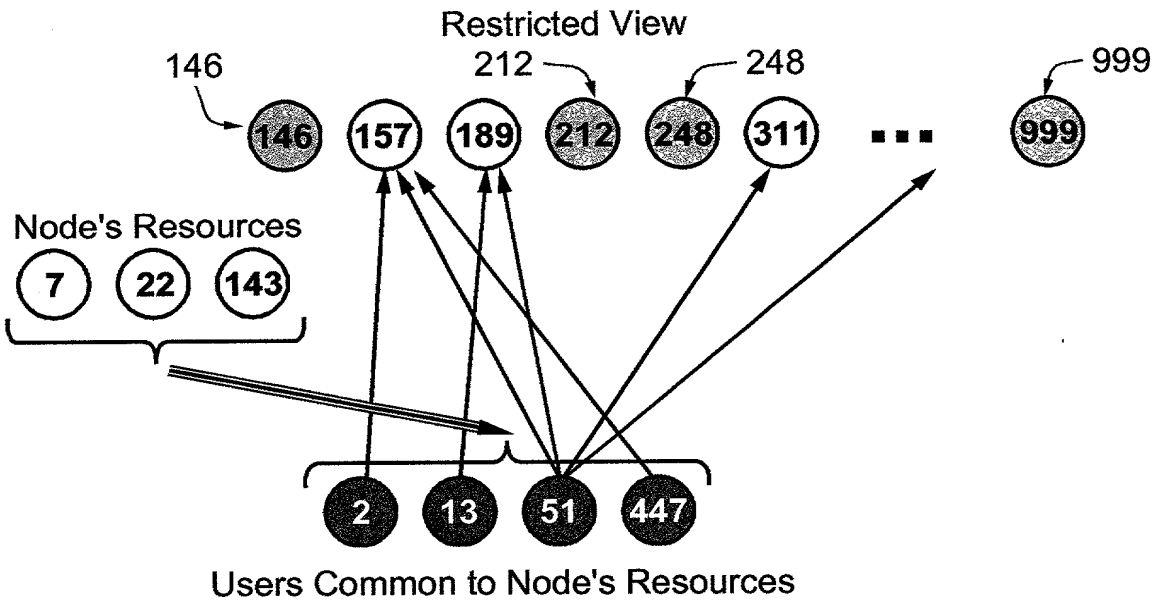
Restricted View
146
212
248
999
146
157
189
212
248
311
999
Node's Resources
7
22
143
2
13
51
447
Users Common to Node's Resources

Fig. 5

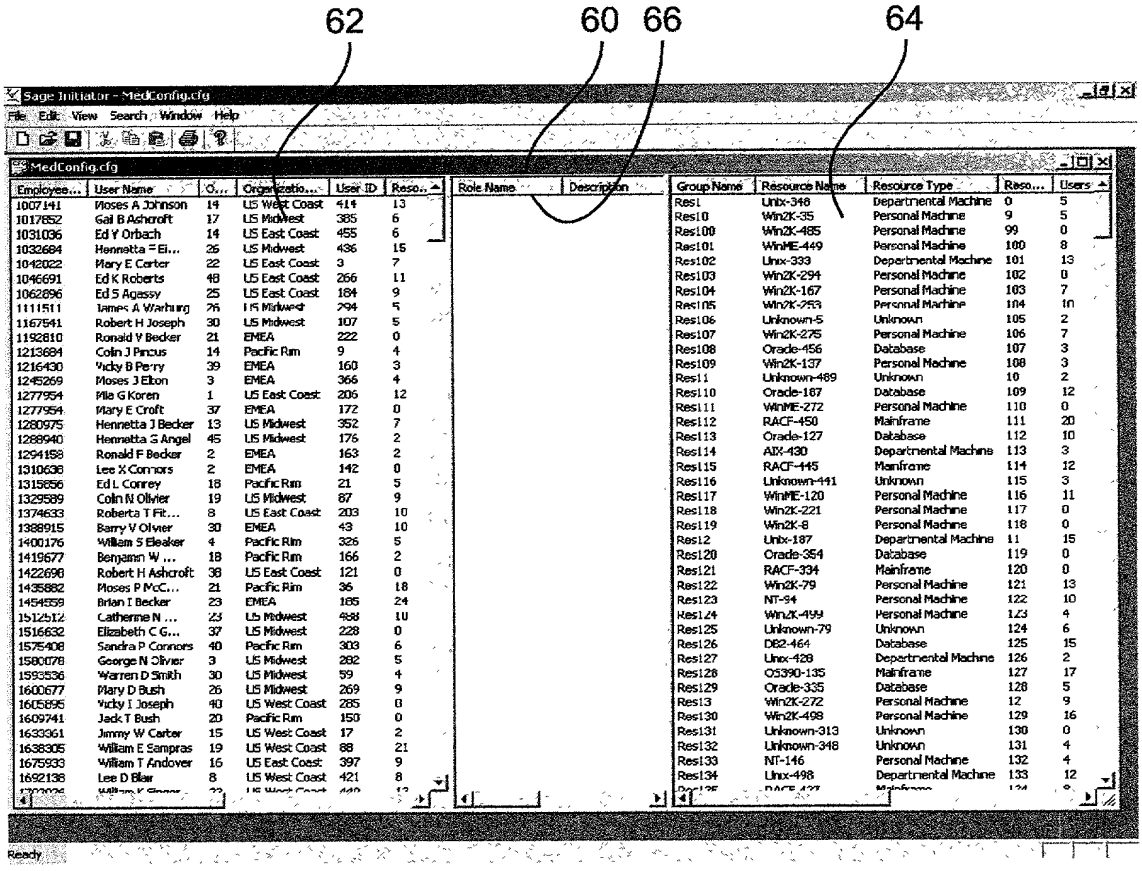
62
60
66
64
Sage Initiator - MedConfig.cfg
File Edit View Search Window Help
MedConfig.cfg
Employee... User Name O... Organizatio... User ID Reso...
1007141 Moses A Johnson 14 US West Coast 414 13
1017852 Gail B Ashcroft 17 US Midwest 385 6
1031036 Ed Y Orbach 14 US East Coast 455 6
1032684 Hennetta E... 26 US Midwest 436 15
1042022 Mary E Carter 22 US East Coast 3 7
1046691 Ed K Roberts 48 US East Coast 266 11
1062896 Ed S Agassy 25 US East Coast 184 9
1111511 James A Warburg 26 US Midwest 294 5
1167841 Robert H Joseph 30 US Midwest 107 5
1192810 Ronald V Becker 21 EMEA 222 0
1213684 Colin J Pincus 14 Pacific Rim 9 4
1216430 Vicky B Perry 39 EMEA 160 3
1245269 Moses J Elton 3 EMEA 366 4
1277954 Mia G Koren 1 US East Coast 206 12
1277954 Mary E Croft 37 EMEA 172 0
1280975 Hennetta J Becker 13 US Midwest 352 7
1288940 Hennetta G Angel 45 US Midwest 176 2
1294158 Ronald F Becker 2 EMEA 163 2
1310638 Lee X Connors 2 EMEA 142 0
1315856 Ed L Conrey 18 Pacific Rim 21 5
1329589 Colin N Olivier 19 US Midwest 87 9
1374633 Roberta T Fit... 8 US East Coast 203 10
1388915 Barry V Olivier 30 EMEA 43 10
1400176 William S Bleaker 4 Pacific Rim 326 5
1419677 Benjamin W ... 18 Pacific Rim 166 2
1422698 Robert H Ashcroft 38 US East Coast 121 0
1435882 Moses P McC... 21 Pacific Rim 36 18
1454558 Brian T Becker 23 EMEA 165 24
1512612 Catherine N ... 23 US Midwest 488 10
1516632 Elizabeth C G... 37 US Midwest 228 0
1575408 Sandra P Connors 40 Pacific Rim 303 6
1580078 George N Olivier 3 US Midwest 282 5
1593536 Warren D Smith 30 US Midwest 99 4
1600677 Mary D Bush 26 US Midwest 269 9
1605895 Vicky I Joseph 40 US West Coast 285 8
1609741 Jack T Bush 20 Pacific Rim 150 0
1633961 Jimmy W Carter 15 US West Coast 17 2
1638305 William E Sampras 19 US West Coast 88 21
1675933 William T Andover 16 US East Coast 397 9
1692138 Lee D Blair 8 US West Coast 421 8
Role Name
Description
Group Name Resource Name Resource Type Reso... Users
Res1 Unix-348 Departmental Machine 0 5
Res10 Win2K-35 Personal Machine 9 5
Res100 Win2K-485 Personal Machine 99 0
Res101 WinME-449 Personal Machine 100 8
Res102 Linux-333 Departmental Machine 101 13
Res103 Win2K-294 Personal Machine 102 0
Res104 Win2K-167 Personal Machine 103 7
Res105 Win2K-253 Personal Machine 104 10
Res106 Unknown-5 Unknown 105 2
Res107 Win2K-275 Personal Machine 106 7
Res108 Oracle-456 Database 107 3
Res109 Win2K-137 Personal Machine 108 3
Res11 Unknown-489 Unknown 10 2
Res110 Oracle-187 Database 109 12
Res111 WinME-272 Personal Machine 110 0
Res112 RACF-450 Mainframe 111 20
Res113 Oracle-127 Database 112 10
Res114 AIX-430 Departmental Machine 113 3
Res115 RACF-445 Mainframe 114 12
Res116 Unknown-441 Unknown 115 3
Res117 WinME-120 Personal Machine 116 11
Res118 Win2K-221 Personal Machine 117 0
Res119 Win2K-8 Personal Machine 118 0
Res12 Unix-187 Departmental Machine 11 15
Res120 Oracle-354 Database 119 0
Res121 RACF-334 Mainframe 120 0
Res122 Win2K-79 Personal Machine 121 13
Res123 NT-94 Personal Machine 122 10
Res124 WinXP-499 Personal Machine 123 4
Res125 Unknown-79 Unknown 124 6
Res126 DB2-464 Database 125 15
Res127 Linux-428 Departmental Machine 126 2
Res128 OS390-135 Mainframe 127 17
Res129 Oracle-335 Database 128 5
Res13 Win2K-272 Personal Machine 12 9
Res130 Win2K-498 Personal Machine 129 16
Res131 Unknown-313 Unknown 130 0
Res132 Unknown-348 Unknown 131 4
Res133 NT-146 Personal Machine 132 4
Res134 Linux-498 Departmental Machine 133 12
Ready

Fig. 6

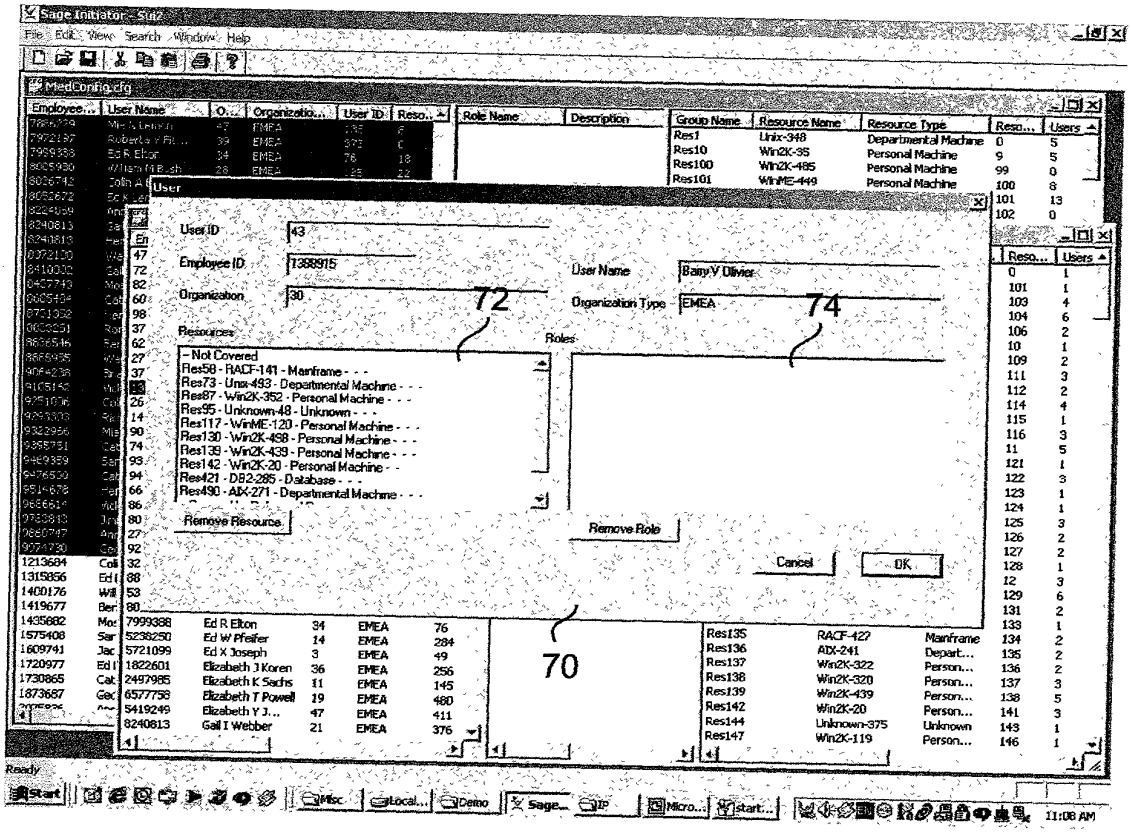
Sage Initiator - Suz
File Edit View Search Window Help
MedConfig.cfg
User
User ID
43
Employee ID
1388915
User Name
Barry V Oliver
Organization
30
Organization Type
EMEA
72
74
Resources
Roles
- Not Covered
Res58 - RACF-141 - Mainframe - - -
Res73 - Unix-493 - Departmental Machine - - -
Res87 - Win2K-352 - Personal Machine - - -
Res95 - Unknown-48 - Unknown - - -
Res117 - WinME-120 - Personal Machine - - -
Res130 - Win2K-458 - Personal Machine - - -
Res135 - Win2K-439 - Personal Machine - - -
Res142 - Win2K-20 - Personal Machine - -
Res421 - DB2-285 - Database - - -
Res490 - AIX-271 - Departmental Machine - - -
Remove Resource
Remove Role
Cancel
OK
70
Ready
11:08 AM

Fig. 7

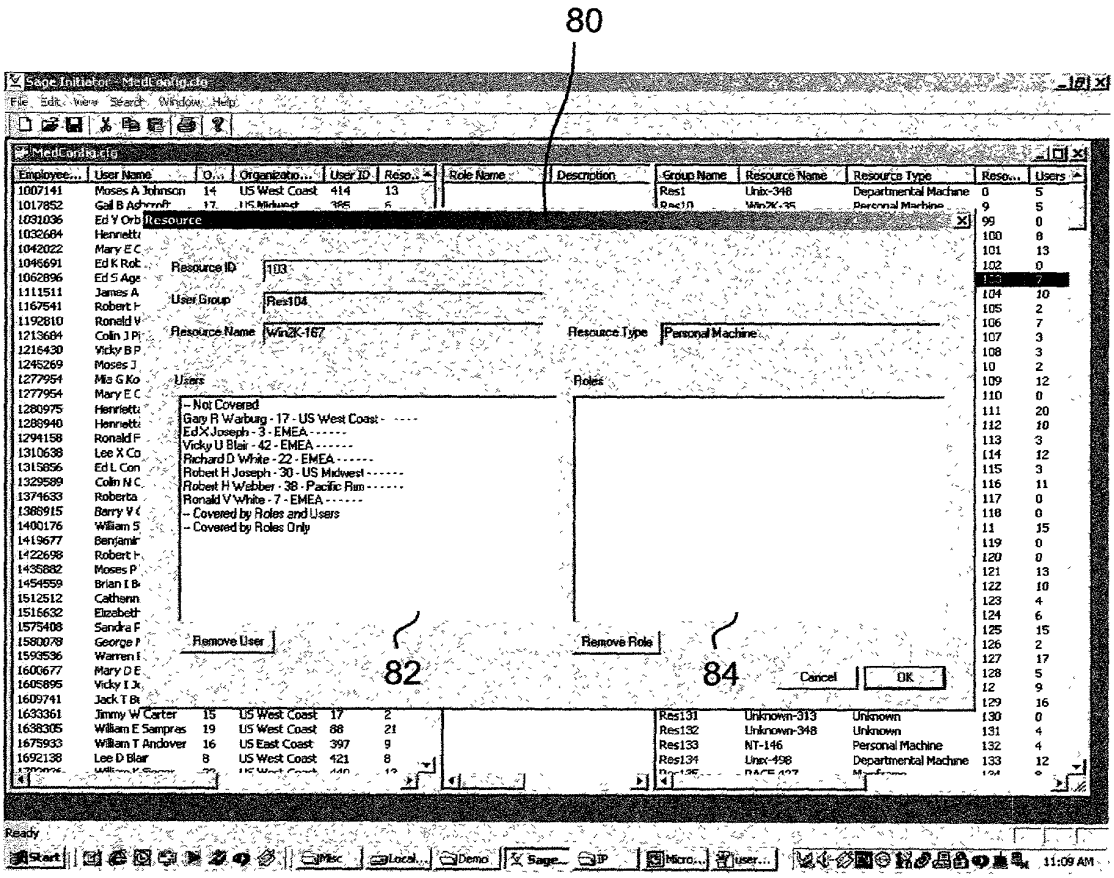
80
Resource
Resource ID
103
User Group
Res104
Resource Name
Win2K-167
Resource Type
Personal Machine
Users
Roles
-- Not Covered
Gary R Warburg - 17 - US West Coast - ----
Ed X Joseph - 3 - EMEA ------
Vicky U Blair - 42 - EMEA ------
Richard D White - 22 - EMEA ------
Robert H Joseph - 30 - US Midwest ------
Robert H Webber - 38 - Pacific Rim ------
Ronald V White - 7 - EMEA ------
-- Covered by Roles and Users
-- Covered by Roles Only
Remove User
Remove Role
82
84
Cancel
OK

Fig. 8

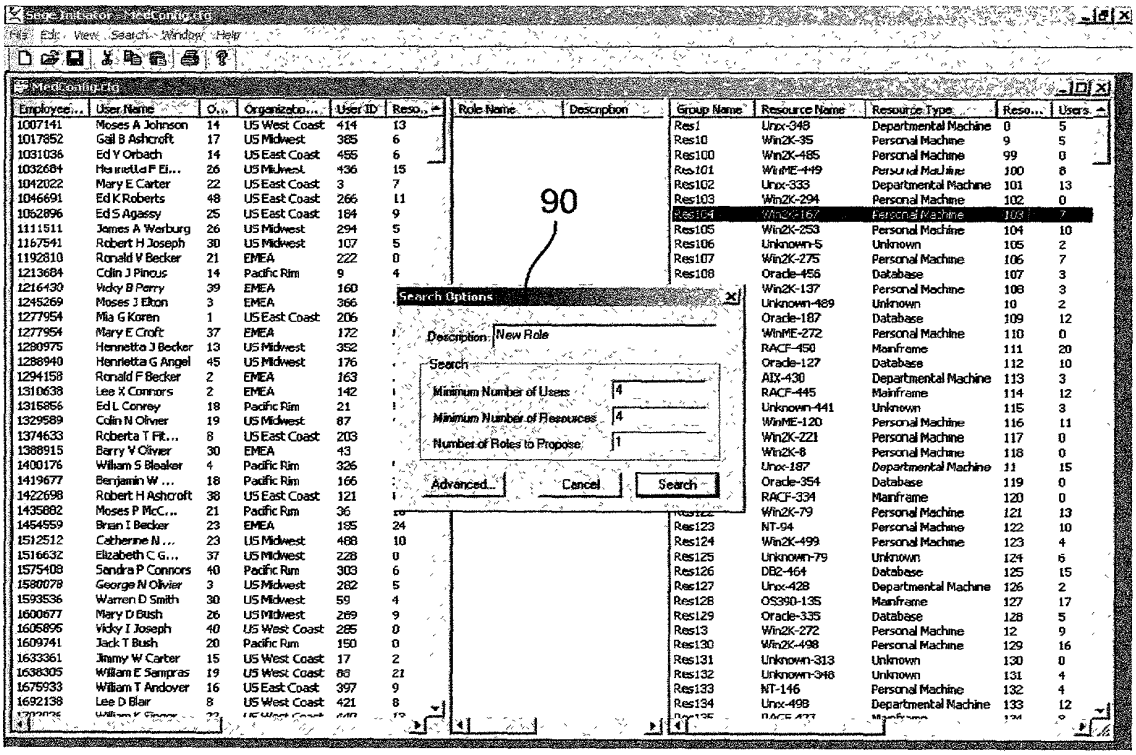
Sage Integrator - MedConfig.cfg
File Edit View Search Window Help
MedConfig.cfg
Employee... User Name O... Organizatio... User ID Reso...
1007141 Moses A Johnson 14 US West Coast 414 13
1017852 Gail B Ashcroft 17 US Midwest 385 6
1031036 Ed Y Orbach 14 US East Coast 455 6
1032684 Henrietta F El... 26 US Midwest 436 15
1042022 Mary E Carter 22 US East Coast 3 7
1046691 Ed K Roberts 48 US East Coast 266 11
1062896 Ed S Agassy 25 US East Coast 184 9
1111511 James A Warburg 26 US Midwest 294 5
1167541 Robert H Joseph 30 US Midwest 107 5
1192810 Ronald V Becker 21 EMEA 222 0
1213684 Colin J Pincus 14 Pacific Rim 9 4
1216430 Vicky B Perry 39 EMEA 160
1245269 Moses J Elton 3 EMEA 366
1277954 Mia G Koren 1 US East Coast 206
1277954 Mary E Croft 37 EMEA 172
1280975 Hennetta J Becker 13 US Midwest 352
1288940 Henrietta G Angel 45 US Midwest 176
1294158 Ronald F Becker 2 EMEA 163
1310638 Lee X Connors 2 EMEA 142
1315856 Ed L Conrey 18 Pacific Rim 21
1329589 Colin N Oliver 19 US Midwest 87
1374633 Roberta T Fit... 8 US East Coast 203
1388915 Barry V Oliver 30 EMEA 43
1400176 William S Bleaker 4 Pacific Rim 326
1419677 Benjamin W ... 18 Pacific Rim 166
1422698 Robert H Ashcroft 38 US East Coast 121
1435882 Moses P McC... 21 Pacific Rim 36
1454559 Brian T Becker 23 EMEA 185 24
1512512 Catherine N ... 23 US Midwest 488 10
1516632 Elizabeth C G... 37 US Midwest 228 0
1575408 Sandra P Connors 40 Pacific Rim 303 6
1580078 George N Olivier 3 US Midwest 282 5
1593536 Warren D Smith 30 US Midwest 59 4
1600677 Mary D Bush 26 US Midwest 269 9
1605895 Vicky I Joseph 40 US West Coast 285 0
1609741 Jack T Bush 20 Pacific Rim 150 0
1633361 Jimmy W Carter 15 US West Coast 17 2
1638305 William E Sampras 19 US West Coast 88 21
1675933 William T Andover 16 US East Coast 397 9
1692138 Lee D Blair 8 US West Coast 421 8
Role Name Description
90
Search Options
Description: New Role
Search
Minimum Number of Users: 4
Minimum Number of Resources: 4
Number of Roles to Propose: 1
Advanced... Cancel Search
Group Name Resource Name Resource Type Reso... Users
Res1 Unix-348 Departmental Machine 0 5
Res10 Win2K-35 Personal Machine 9 5
Res100 Win2K-485 Personal Machine 99 0
Res101 WinME-449 Personal Machine 100 8
Res102 Unix-333 Departmental Machine 101 13
Res103 Win2K-294 Personal Machine 102 0
Res104 Win2K-167 Personal Machine 103 7
Res105 Win2K-253 Personal Machine 104 10
Res106 Unknown-5 Unknown 105 2
Res107 Win2K-275 Personal Machine 106 7
Res108 Oracle-456 Database 107 3
Win2K-137 Personal Machine 108 3
Unknown-489 Unknown 10 2
Oracle-187 Database 109 12
WinME-272 Personal Machine 110 0
RACF-450 Mainframe 111 20
Oracle-127 Database 112 10
AIX-430 Departmental Machine 113 3
RACF-445 Mainframe 114 12
Unknown-441 Unknown 115 3
WinME-120 Personal Machine 116 11
Win2K-221 Personal Machine 117 0
Win2K-8 Personal Machine 118 0
Unix-187 Departmental Machine 11 15
Oracle-354 Database 119 0
RACF-334 Mainframe 120 0
Win2K-79 Personal Machine 121 13
Res123 NT-94 Personal Machine 122 10
Res124 Win2K-499 Personal Machine 123 4
Res125 Unknown-79 Unknown 124 6
Res126 DB2-464 Database 125 15
Res127 Unix-428 Departmental Machine 126 2
Res128 OS390-135 Mainframe 127 17
Res129 Oracle-335 Database 128 5
Res13 Win2K-272 Personal Machine 12 9
Res130 Win2K-498 Personal Machine 129 16
Res131 Unknown-313 Unknown 130 0
Res132 Unknown-348 Unknown 131 4
Res133 NT-146 Personal Machine 132 4
Res134 Unix-498 Departmental Machine 133 12

Fig. 9

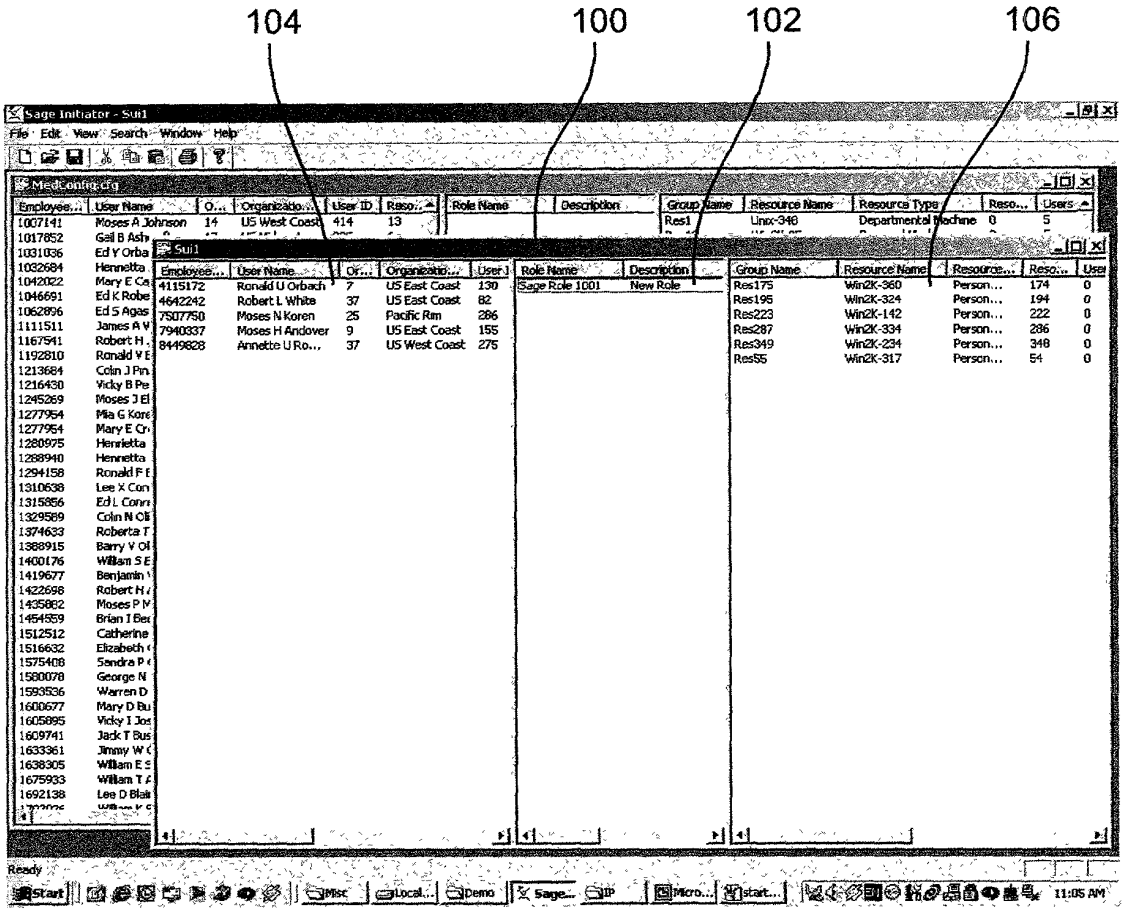
104
100
102
106
Sage Initiator - Sui1
File Edit View Search Window Help
MedConfig.cfg
Employee... User Name O... Organizatio... User ID Reso...
1007141 Moses A Johnson 14 US West Coast 414 13
Role Name
Description
Group Name
Resource Name
Resource Type
Reso...
Users
Res1
Linux-348
Departmental Machine
0
5
Sui1
Employee... User Name Or... Organizatio... User I
4115172 Ronald U Orbach 7 US East Coast 130
4642242 Robert L White 37 US East Coast 82
7507750 Moses N Koren 25 Pacific Rim 286
7940337 Moses H Andover 9 US East Coast 155
8449828 Annette U Ro... 37 US West Coast 275
Role Name Description
Sage Role 1001 New Role
Group Name Resource Name Resource... Reso... Use
Res175 Win2K-360 Person... 174 0
Res196 Win2K-324 Person... 194 0
Res223 Win2K-142 Person... 222 0
Res287 Win2K-334 Person... 286 0
Res349 Win2K-234 Person... 348 0
Res55 Win2K-317 Person... 54 0
Ready
Start
Misc
Local...
Demo
Sage...
IP
Micro...
start...
11:05 AM

Fig. 10

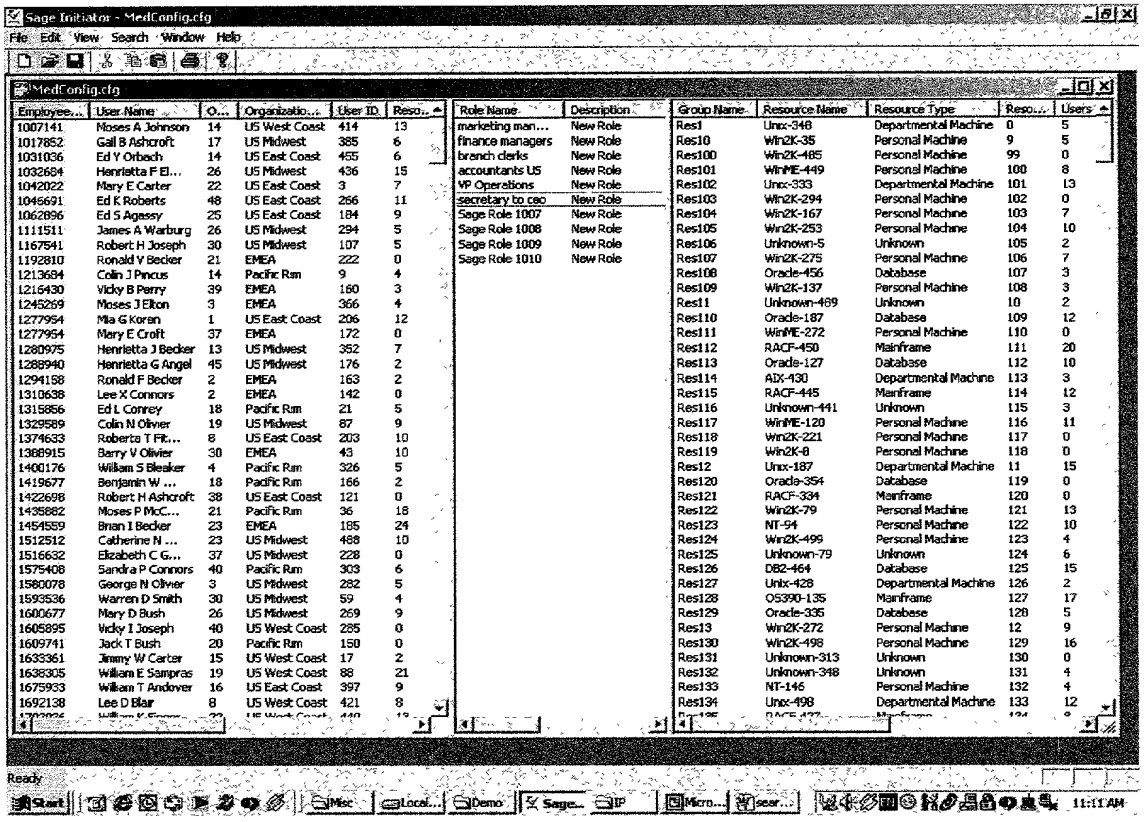
Sage Initiator - MedConfig.cfg
File Edit View Search Window Help
MedConfig.cfg
Employee... User Name O... Organizatio... User ID Reso...
1007141 Moses A Johnson 14 US West Coast 414 13
1017852 Gail B Ashcroft 17 US Midwest 385 6
1031036 Ed Y Orbach 14 US East Coast 455 6
1032684 Henrietta F El... 26 US Midwest 436 15
1042022 Mary E Carter 22 US East Coast 3 7
1046691 Ed K Roberts 48 US East Coast 266 11
1062896 Ed S Agassy 25 US East Coast 184 9
1111511 James A Warburg 26 US Midwest 294 5
1167541 Robert H Joseph 30 US Midwest 107 5
1192810 Ronald V Becker 21 EMEA 222 0
1213684 Colin J Pincus 14 Pacific Rim 9 4
1216430 Vicky B Perry 39 EMEA 160 3
1245269 Moses J Elton 3 EMEA 366 4
1277954 Mia G Koran 1 US East Coast 206 12
1277954 Mary E Croft 37 EMEA 172 0
1280975 Henrietta J Becker 13 US Midwest 352 7
1288940 Henrietta G Angel 45 US Midwest 176 2
1294158 Ronald F Becker 2 EMEA 163 2
1310638 Lee X Connors 2 EMEA 142 0
1315856 Ed L Conrey 18 Pacific Rim 21 5
1329589 Colin N Olivier 19 US Midwest 87 9
1374633 Roberta T Fit... 8 US East Coast 203 10
1388915 Barry V Olivier 30 EMEA 43 10
1400176 William S Bleaker 4 Pacific Rim 326 5
1419677 Benjamin W ... 18 Pacific Rim 166 2
1422698 Robert H Ashcroft 38 US East Coast 121 0
1435882 Moses P McC... 21 Pacific Rim 36 18
1454559 Brian I Becker 23 EMEA 185 24
1512512 Catherine N ... 23 US Midwest 488 10
1516632 Elizabeth C G... 37 US Midwest 228 0
1575408 Sandra P Connors 40 Pacific Rim 303 6
1580078 George N Olivier 3 US Midwest 282 5
1593536 Warren D Smith 30 US Midwest 59 4
1600677 Mary D Bush 26 US Midwest 269 9
1605895 Vicky I Joseph 40 US West Coast 285 0
1609741 Jack T Bush 20 Pacific Rim 150 0
1633361 Jimmy W Carter 15 US West Coast 17 2
1638305 William E Sampras 19 US West Coast 88 21
1675933 William T Andover 16 US East Coast 397 9
1692138 Lee D Blair 8 US West Coast 421 8
Role Name Description
marketing man... New Role
finance managers New Role
branch clerks New Role
accountants US New Role
VP Operations New Role
secretary to ceo New Role
Sage Role 1007 New Role
Sage Role 1008 New Role
Sage Role 1009 New Role
Sage Role 1010 New Role
Group Name Resource Name Resource Type Reso... Users
Res1 Unix-348 Departmental Machine 0 5
Res10 Win2K-35 Personal Machine 9 5
Res100 Win2K-485 Personal Machine 99 0
Res101 WinME-449 Personal Machine 100 8
Res102 Unix-333 Departmental Machine 101 13
Res103 Win2K-294 Personal Machine 102 0
Res104 Win2K-167 Personal Machine 103 7
Res105 Win2K-253 Personal Machine 104 10
Res106 Unknown-5 Unknown 105 2
Res107 Win2K-275 Personal Machine 106 7
Res108 Oracle-456 Database 107 3
Res109 Win2K-137 Personal Machine 108 3
Res11 Unknown-489 Unknown 10 2
Res110 Oracle-187 Database 109 12
Res111 WinME-272 Personal Machine 110 0
Res112 RACF-450 Mainframe 111 20
Res113 Oracle-127 Database 112 10
Res114 AIX-430 Departmental Machine 113 3
Res115 RACF-445 Mainframe 114 12
Res116 Unknown-441 Unknown 115 3
Res117 WinME-120 Personal Machine 116 11
Res118 Win2K-221 Personal Machine 117 0
Res119 Win2K-8 Personal Machine 118 0
Res12 Unix-187 Departmental Machine 11 15
Res120 Oracle-354 Database 119 0
Res121 RACF-334 Mainframe 120 0
Res122 Win2K-79 Personal Machine 121 13
Res123 NT-94 Personal Machine 122 10
Res124 Win2K-499 Personal Machine 123 4
Res125 Unknown-79 Unknown 124 6
Res126 DB2-464 Database 125 15
Res127 Unix-428 Departmental Machine 126 2
Res128 OS390-135 Mainframe 127 17
Res129 Oracle-335 Database 128 5
Res13 Win2K-272 Personal Machine 12 9
Res130 Win2K-498 Personal Machine 129 16
Res131 Unknown-313 Unknown 130 0
Res132 Unknown-348 Unknown 131 4
Res133 NT-146 Personal Machine 132 4
Res134 Unix-498 Departmental Machine 133 12
Ready
Start
Misc
Local...
Demo
Sage...
IP
Micro...
sear...
11:11 AM

Fig. 11